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(54) **LINERS OR BAGS AND METHOD OF MAKING THEM**

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(52) **U.S. Cl.** **383/37**; 383/120; 493/210; 493/244
(58) **Field of Search** 383/120, 37, 104, 383/121; 493/210, 244

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,524,459 A	*	6/1985	Titchenal	383/122
4,561,107 A	*	12/1985	Herder	383/122
4,685,148 A	*	8/1987	Titchenal	383/100
5,100,000 A	*	3/1992	Huseman	206/554
5,104,236 A		4/1992	LaFleur	
5,918,984 A	*	7/1999	LaFleur et al.	206/554
6,371,646 B1	*	4/2002	LaFleur	383/109

FOREIGN PATENT DOCUMENTS

FR	002672033 A1	*	7/1992	383/120
NL	7611389	*	4/1978	383/120
WO	WO 9008071	*	7/1990	383/37

* cited by examiner

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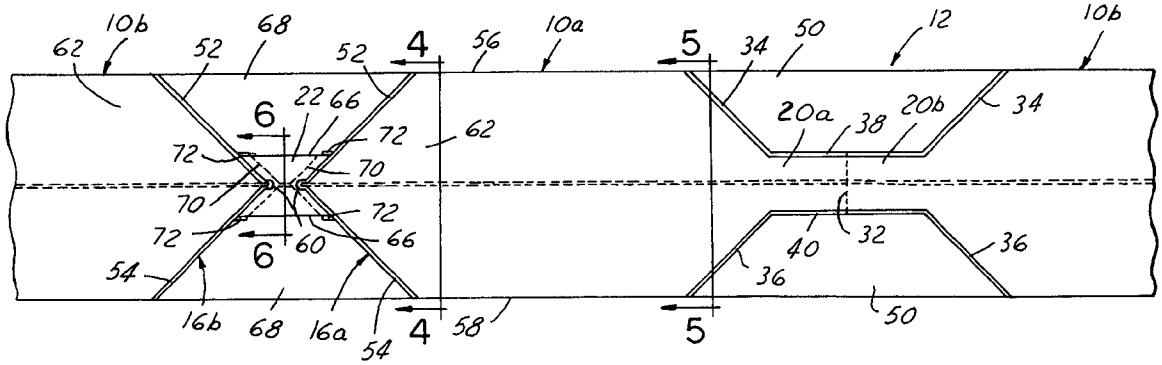
(57) **ABSTRACT**

A method of forming a plurality of interconnected bulk bags or with an interconnecting section of material between adjacent bags on a roll or blank of flexible material to permit the blank of material to be advanced for subsequent processing. The interconnecting section is defined at least in part by a separation line that permits scrap or waste material to be removed from the blank without removing the interconnecting section. This permits the bags to remain interconnected after they are formed so that they may be disposed on a roll or folded in a box for convenient shipping and handling of a plurality of bags. Desirably, perforations maybe provided between adjacent bags to facilitate removal of an individual bag from the remainder.

24 Claims, 3 Drawing Sheets



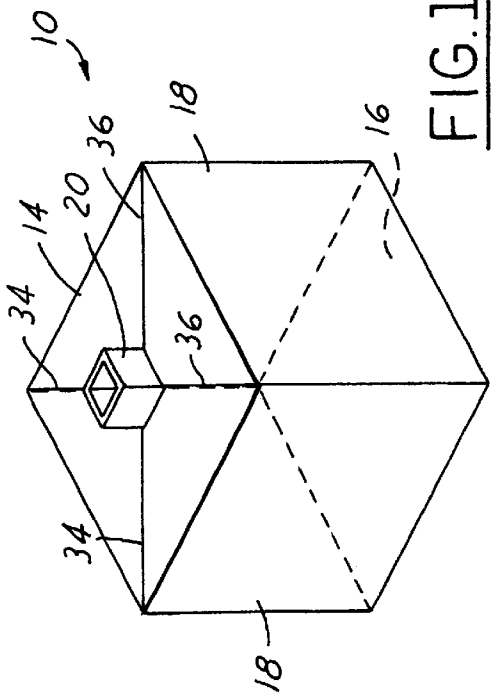


FIG. 1

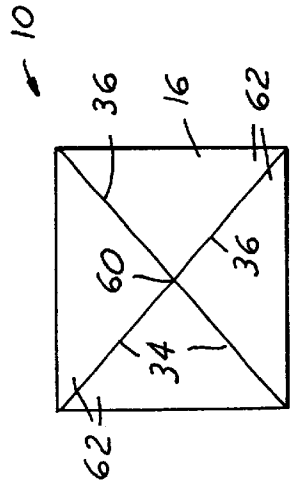


FIG. 2

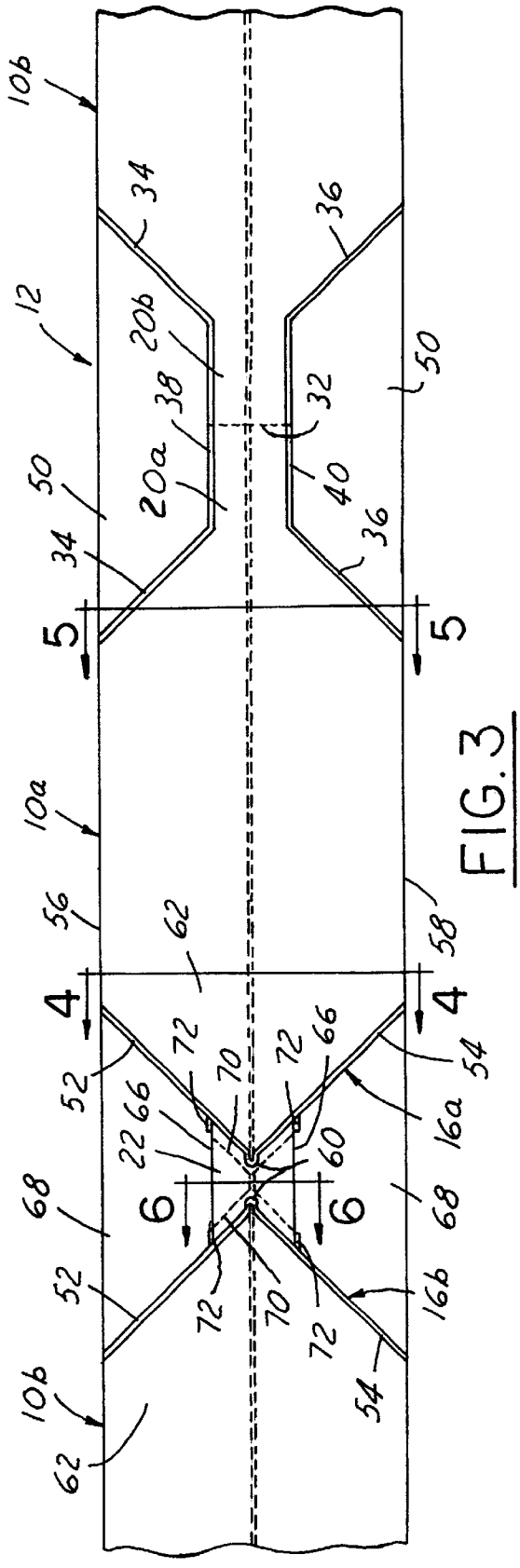


FIG. 3

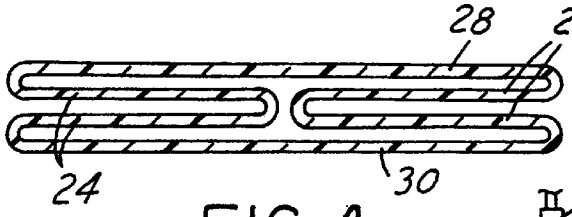


FIG. 4

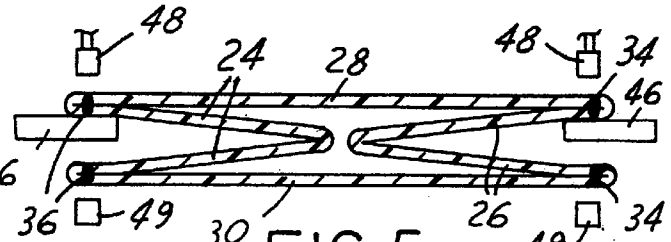


FIG. 5

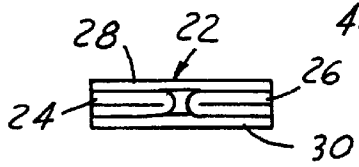


FIG. 6

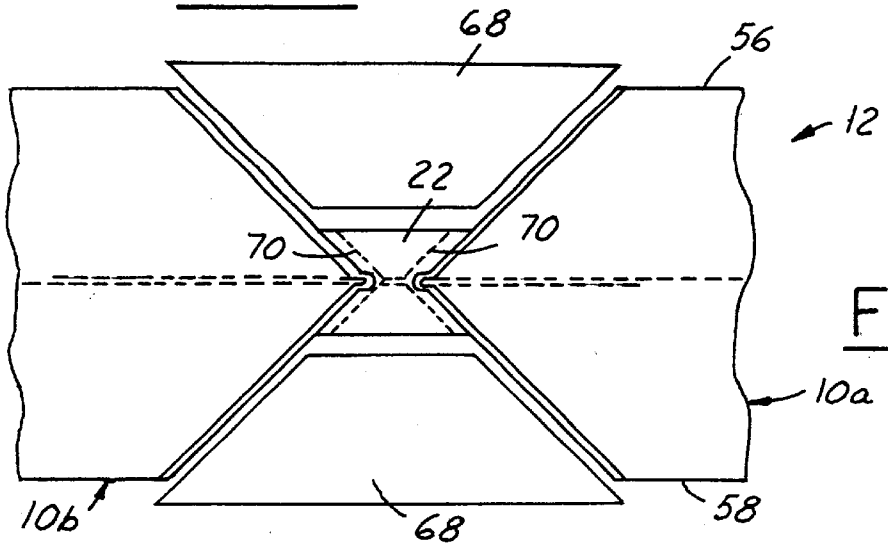


FIG. 7

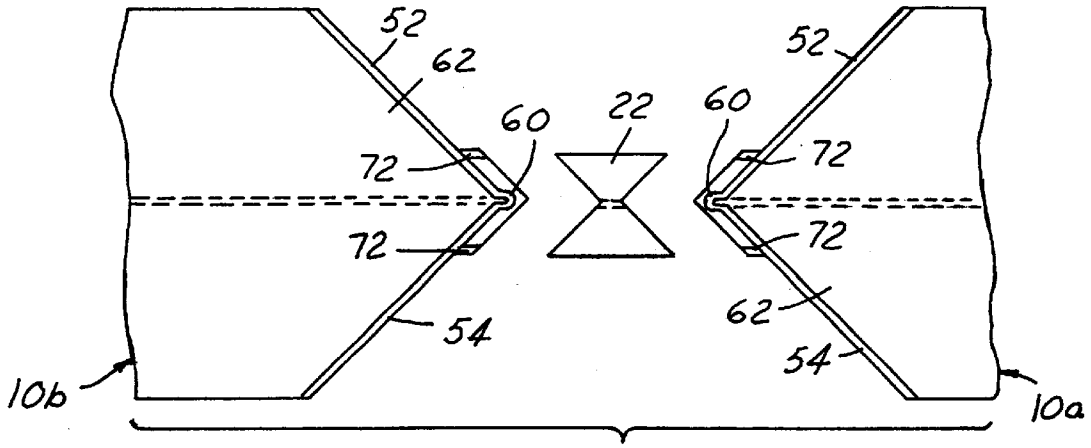


FIG. 8

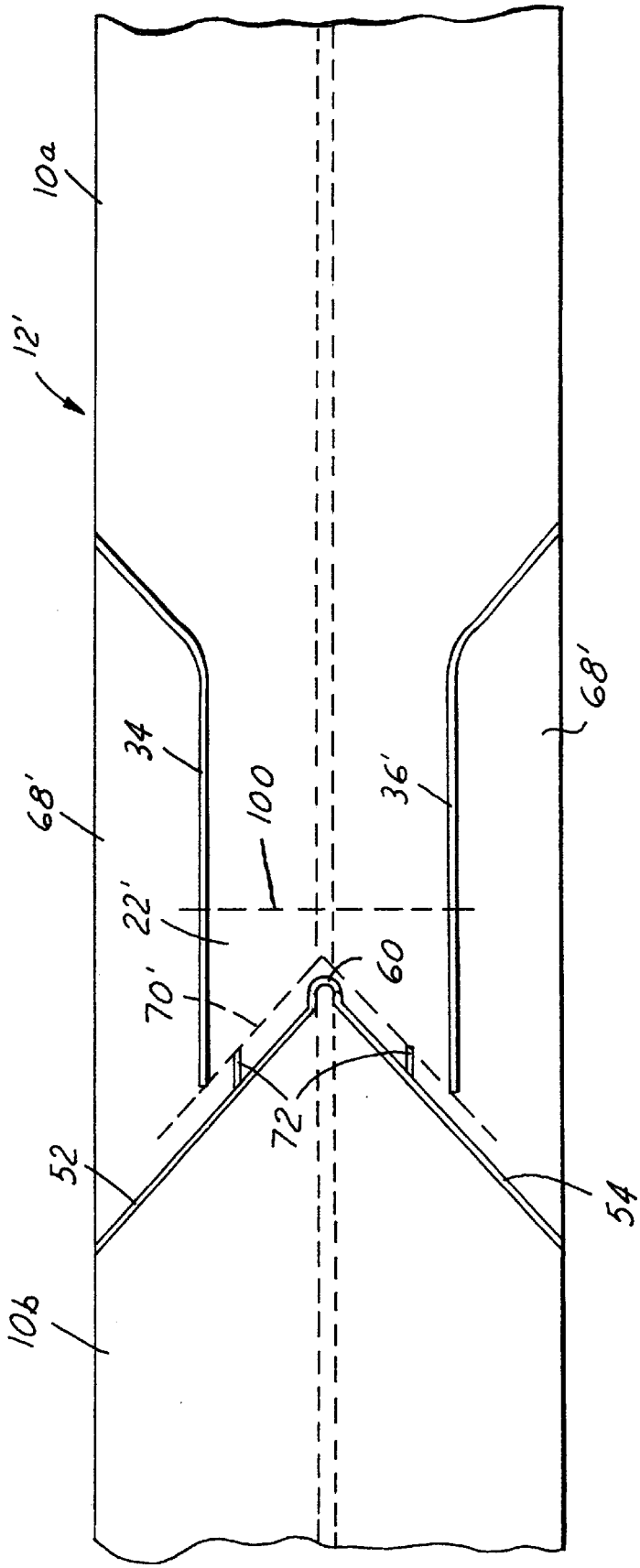


FIG. 9

LINERS OR BAGS AND METHOD OF MAKING THEM

FIELD OF THE INVENTION

This invention relates generally to containers and more particularly to bags or liners formed of flexible material.

BACKGROUND OF THE INVENTION

Many granular and liquid products have been shipped and stored in large bulk bags or bulk containers with liners, which may contain as much as a ton or more of material. Some of these bulk bags are flexible, contain a liner, and when empty can be folded to a generally flat condition. One such flexible bag and liner is disclosed and claimed in U.S. Pat. No. 5,104,236. These flexible bags and liners for bulk containers, have been formed from a single tubular blank of material to form generally rectangular ends interconnected by generally rectangular side walls. When filled, these bags can be stacked one on top of another. For some applications, the bags may be made of a woven fabric and for other applications, a plastic film or sheet material. For some applications, particularly for storing liquids, a bag or liner of a liquid impervious film material is received in and reinforced and protected by bag of a woven fabric. Usually these bags have a spout in one or both ends for filling and emptying the bags.

Some such flexible bulk bags are formed by folding one or more blanks of flexible material to provide a pair of gusset panels folded inwardly and disposed between a pair of overlying flat panels. Heat seals or stitching along inclined lines forming triangular portions at one or both ends of the bag provide integral, rectilinear end walls of the bag interconnected by four sidewalls. Some bags include a spout extending from their upper end wall to facilitate filling and emptying the bag and have a completely closed bottom wall forming a so-called "V-bottom" bag wherein the bottom of the bag is generally V-shaped when the bag is gusseted and folded flat.

Desirably, the blanks of flexible material used to form the bulk bags may be provided in elongate rolls to facilitate manufacture of a plurality of bags. With bags having a spout at one end and a closed V-shaped opposite end it is preferable to form a plurality of bags on the rolls of material with the V-shaped wall of each bag adjacent to a V-shaped wall of an adjacent bag. So arranged the spout of each bag is connected to or adjacent to a spout of another adjacent bag on the roll of material. Bags can also be arranged with the V-shaped wall adjacent to the spout of the adjacent bag. After heat sealing adjacent V-shaped end walls, or adjacent V-shaped walls and spout, and removing the waste or scrap material between the adjacent bags, there is no material left between adjacent bags on the roll of material due at least in part to the heat seals leading to the apex of the V-shaped wall, separating the blank between the bags. This prevents subsequent processing equipment from pulling or advancing the roll of material for subsequent processing. Accordingly, bags of this type had to be separated from the roll of material along a straight line perpendicular to side edges of the blank to provide smaller, individual rectangular blanks that are individually processed to form at least the V-shaped wall of each bag. This increases the time, labor and cost to make the bags, reduces the ability to automate the manufacturing process and greatly reduces the efficiency of the manufacturing process.

SUMMARY OF THE INVENTION

A method of forming a plurality of interconnected bulk bags or liners with an interconnecting section of material between adjacent bags on a roll or blank of flexible material to permit the blank of material to be advanced for subsequent processing. The interconnecting section is defined at least in part by a separation line that permits scrap or waste material to be removed from the blank without removing the interconnecting section. This permits the bags to remain interconnected after they are formed so that they may be disposed on a roll or folded in a box for convenient shipping and handling of a plurality of bags. Desirably, perforations maybe provided between adjacent bags to facilitate removal of an individual bag from the remainder.

Preferably, closed ends of the bags are formed by heat sealing a gusseted blank of material along inclined lines forming so-called V-shaped end walls when the bags are folded flat. Waste or scrap material between the heat seal lines of adjacent V-shaped end walls of two adjacent bags on the blank may be removed without removing the interconnecting material between adjacent closed ends of the adjacent bags. To accomplish this, tear lines extend to the heat seal lines, which form the closed end of each bag to separate the waste material from the interconnecting section of material between the bags. Accordingly, when the waste material is removed by tearing or peeling along and outboard of the heat seal line of the closed end of the bag, such tear continues until it reaches and follows along the tear line to prevent removal of the interconnecting section between adjacent bags. Desirably, serration's are provided in the interconnecting section between the adjacent bags to facilitate subsequent removal of the interconnecting section prior to use of the bags.

Objects, features and advantages of this invention include enabling substantially automated manufacture of a plurality of bags with a V-shaped end wall from one or more rolls or blanks of flexible material, permitting a plurality of bags to remain interconnected after forming so that they may be further processed, allowing a plurality of bags with a V-shaped end wall to be rolled up or otherwise manipulated for convenient shipping and handling prior to their use, facilitates manufacture of adjacent bags having adjacent V-shaped end walls and bags having a V-shaped end wall disposed adjacent to a spout of an adjoining bag, reduces the time, labor and cost to form a plurality of bulk bags, can be readily implemented with substantially conventional bag manufacturing machines, eliminates the need to separate individual bags from the blank to form closed ends of the bags, increases the efficiency of the bag forming machinery and process and is of relatively simple design.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of this invention will be apparent from the following detailed description of the preferred embodiments and best mode, appended claims and accompanying drawings in which:

FIG. **1** is a perspective view of a bulk bag formed according to the method of the invention;

FIG. **2** is an end view of the bottom wall of the bag;

FIG. **3** is a plan view illustrating a plurality of interconnected bags formed from an elongate blank or roll of material with a V-shaped wall of one bag adjacent to a V-shaped wall of an adjacent bag;

FIG. **4** is a sectional view taken generally along line **4—4** of FIG. **3**;

FIG. **5** is a sectional view taken generally along line **5—5** of FIG. **3**;

FIG. **6** is a sectional view taken generally along line **6—6** of FIG. **3**;

FIG. **7** is an enlarged fragmentary plan view illustrating the adjacent ends of a pair of adjacent bags on the roll of material; and

FIG. **8** is a fragmentary plan view illustrating adjacent ends of the bags separated from the roll of material; and

FIG. **9** is a plan view illustrating adjacent bags on a blank according to an alternate embodiment of the invention and having a V-shaped end wall of one bag adjacent to the spout of the other bag.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring in more detail to the drawings, FIGS. **1–3** illustrate a collapsible bulk container or liner bag **10** according to the present invention which enables a plurality of such bags or liners **10***a*, **10***b* to be formed integrally along an elongate tubular web or blank **12** of a flexible material. The bulk bags **10** have a generally cubical configuration when expanded with generally rectilinear top **14**, bottom **16** and sidewalls **18** with an integral spout **20** extending from the top wall **14** and providing an opening into the interior of the bag **10** to facilitate filling and emptying the bag. When a plurality of bags **10** are integrally formed with the bottom walls **16** of adjacent bags next to each other, an interconnecting section **22** of material permits the elongate blank **12** to be pulled or moved through downstream workstations and machinery without breaking or separating the elongate blank **12** between adjacent bags **10**.

The elongate blank **12** of material is preferably formed of a plastic film such as polyethylene or polypropylene plastic films generally having a thickness in the range of 4 to 10 mils, although other materials may suitably be used. Woven materials may also be used and a bulk bag or liner **10** formed from a plastic film material may be used in combination with a bag formed from a woven material if a high strength and leak proof container is desired. As best shown in FIG. **4**, the elongate tubular blank **12** is preferably folded or otherwise manipulated to provide a pair of gusseted panels **24**, **26** extending inwardly and disposed between a pair of overlying flat panels **28**, **30**. The elongate tubular blank **12** may be formed from a flat sheet with opposite side edges connected together to form a tube, may be initially provided as a circumferentially continuous tube, or may be formed from multiple blanks of material connected together to provide the desired gusseted arrangement.

To form a plurality of bags **10** along the gusseted blank **12**, a plurality of heat seals are provided with perforations provided between adjacent bags **10***a*, **10***b* to facilitate removing a bag **10** from the blank **12**. As shown in FIG. **3**, desirably, the spouts **20***a*, **20***b* of adjacent bags **10***a*, **10***b* are connected together with a perforated line **32** separating the spout **20***a* of one bag **10***a* from the spout **20***b* of the other bag **10***b*. Inclined or diagonal heat seals **34**, **36** define the upper wall **14** of each bag **10***a*, **10***b* and lead to parallel heat seals **38**, **40** defining the spout **20** of each bag **10**.

The parallel heat seals **38**, **40** preferably continue from one bag **10***a* to the adjacent bag **10***b* to form it's spout **20***b* and lead to the inclined heat seals **34**,**36** defining the top wall **14** of that bag **10***b*. As best shown in FIG. **5**, each overlying flat panel **28**, **30** is only heat sealed to the adjacent portion of only its adjacent gusseted panels **24**, **26** without the overlapped portions of the gusseted panels **24**, **26** being heat sealed together. To accomplish this, a material of low thermal conductivity, such as a rubber or teflon pad **46**, is inserted between the gusseted panels **24**, **26** during the heat sealing operation. Desirably, a pair of heat sealers **48**, **49** are used with one on each side of the blank **12** to more evenly form the heat seals **34**, **36**, **38**, **40** with the rubber or teflon pad **46** between them. So formed, the heat seals **34**, **36**, **38**, **40** also define waste portions **50**, which may be peeled away from the blank **12** and discarded. Desirably, when the heat sealers **48**, **49** are engaged with the blank **12** and after the material of the blank **12** is sufficiently heated to form the heat seals, and while still warm the waste material **50** may be readily peeled away from the tubular blank along and outboard of the heat seals. With the spouts **20** of adjacent bags **10** still connected the elongate blank **12** may be advanced by automated machinery to subsequent workstations, such as to form the perforated line **32** facilitating separation of the spouts **20** of adjacent bags **10**.

As shown in FIGS. **2**,**3**, **7** and **8**, to form the bottom wall **16** of each bag **10** on the elongate blank **12**, each flat panel **28**, **30** is connected to adjacent portions of the gusset panels **24**, **26** along inclined or diagonal lines **52**, **54**. The inclined lines **52**, **54** extend from side edges **56**, **58** of the blank **12** to an apex **60** and define triangular portions **62** and a so-called V-bottom bulk bag. Desirably, the inclined heat seal lines **52**, **54** intersect at a semi-circular juncture defining the apex **60** rather than at a point to provide a small amount of excess material in the bottom wall **16** of the bag **10** to reduce stress or strain at the juncture of the heat seals **52**, **54** in the bottom of the wall of the bag when filled. Notably, at the apex **60** or juncture of the heat seals **52**, **54**, a plurality of layers of material are heat sealed together and therefore it is difficult to provide a sufficient heat seal without overheating or over melting of the bag material or under heating such that the heat seal is weak and may rupture in use. Accordingly, the extra material is desirable to reduce strain on the heat seals in this area. As with the top wall **14** of the bag **10**, each of the overlying flat panels **28**, **30** is heat sealed only to an adjacent portion of its adjacent gusseted panel **24** and **26** without heat sealing the overlapped portions of the gusseted panels **24**,**26** to themselves. When heat-sealed in this manner, the bottom wall **16** will be closed and substantially flat when the bag **10** is expanded.

According to an embodiment of the present invention, as shown in FIGS. **3**, **7** and **8**, bottom walls **16***a*, **16***b* of adjacent bags **10***a*, **10***b* are disposed adjacent to each other on the elongate blank. In conventional bags and methods of forming them, after the heat seals **52**, **54** defining the bottom walls of adjacent bags are formed, all the material between the bags **10***a*, **10***b* would zipper, tear or peel away from the bags along the heat seals **52**, **54** separating the bags from the blank **12** and separating the blank **12** between the ends of the bags **10***a*, **10***b*. To prevent all of the waste or scrap material from being removed from the blank **12** between the bottom walls **16** of adjacent bags **10**, such that the elongate blank **12** would be separated between the bottom walls **16** of adjacent bags **10**, a slit or tear line **66** is provided extending from each heat seal line **52**, **54** (in both flat panels **28**, **30**) of one bag **10***a* to a corresponding heat seal **52**, **54** in the adjacent bag **10***b*. When formed, a pair of substantially parallel, spaced apart tear lines **66** are formed in each flat panel **28**,**30** between adjacent bags **10***a*, **10***b* with an interconnecting section **22** of the blank between them and waste material **68** outboard of the tear lines **66**. As shown, the tear lines **66** may be parallel and disposed on opposite sides of the apex **60** of each bag. Preferably the tear lines **66** are arranged in the direction of movement of the blank **12** to prevent the tear lines **66** from snagging or catching on components of the manufacturing equipment.

The interconnecting section **22** maintains the connection between adjacent bottom walls **16** of adjacent bags **10** to

permit the elongate blank **12** to be pulled through further processing machines. Preferably, separation lines **70** which facilitate separation of individual bags **10** from the blank **12** are formed in the interconnecting section **22** and define two generally "V"-shaped lines. These "V" shaped lines follow the contours of the heat seal lines **52, 54** defining the bottom walls **16** of the bags **10**, to reduce the extraneous material attached to the bottom wall **16** of each bag **10** when a bag is separated from the blank **12** for use. The tear lines **66** are preferably completely cut through the blank **12** or are a severely weakened or perforated portion of the blank **12** which tears more readily than the perforations from the blank **70** in the interconnecting section **22** to prevent separation of the interconnecting section **22** when the waste material **68** is removed. If both the tear lines **66** and separation lines **70** are formed by aligned perforations, the distance between adjacent perforations in a separation line **70** is preferably greater than the distance between adjacent perforations in a tear line **66** so that the tear lines **66** rip or tear more easily than the separation lines **70**. The separation lines **70** and/or the tear lines **66** may provide reference points which facilitate locating the blank and bags thereon with various workstations. A laser or other visual indicator may be used as a reference with which the separation line **70**, tear lines **66** or other feature of the bags may be aligned.

Preferably, to facilitate removing the waste material **68**, a short tear diverter line **72** forms part of each tear line **66** and extends between each tear line **66** and a corresponding heat seal line **52** or **54** of each bag **10**. Each tear diverter line **72** preferably comprises a short heat seal preferably formed at the same time as the heat seals **52, 54** by a tang or extension of the heat sealers **48, 49**. Any rip or tear along the heat seals **52, 54** to remove the waste material **68** follows the tear diverter lines **72** to the remainder of the tear lines **66** which comprise either a complete cut through the blank **12** or aligned perforations, as previously discussed. Removal of the waste material **68** may occur while the heat sealers **48, 49** are engaged with the blank **12** such that the tang on the heat sealers helps to direct the tear along the tear diverter lines **72** to the tear lines **66** to leave the interconnecting section **22** in tact.

When constructed, to remove the waste material **68** it is separated from the edges **56, 58** of the blank **12** along the inclined heat seal lines **52, 54** defining the bottom wall **16** to the tear lines **66**. The tear diverter lines **72** and the tangs which form them direct the tear or removal of the waste material to the tear lines **66**. The tearing away of the waste material **68** continues along the tear lines **66** to the tear diverter lines **72** of the bottom wall **16** of the adjacent bag **10** and along the heat seal lines **52, 54** of the bottom wall of the adjacent bag **10** to the edges **56, 58** of the blank **12** completing removal of the waste material **68**. Because the tear lines **66**, preferably including the tear diverter lines **72**, prevent removal of the interconnecting section **22** during processing of the elongate blank **12** to form a plurality of interconnected bulk bags **10**, the blank **12** may be pulled or moved through subsequent processing machines and may be wound on a roll or accordion folded into a box as convenient for shipping and subsequent detachment and use of individual bags **10**. As shown in FIGS. **7** and **8**, when it is desired to separate a bag **10** from the elongate blank **12** it may be removed by tearing along the separation line **70** adjacent to that bag **10**. At the same time or prior to use of the next bag **10** on the blank **12**, the interconnecting section **22**, which is generally shaped like a bow tie, may be removed along the other separation line **70** and discarded.

Accordingly, a plurality of bulk bags or liners **10** may be formed on an elongate blank **12** with an interconnecting section **22** connecting adjacent "V-shaped" end walls of the bags **10** to permit the blank **12** to be pulled or moved through subsequent processing without breaking or separating the blank **12** between adjacent bags **10**. Still further, tear lines **66**, which define in part waste material **68** between adjacent end or bottom walls **16** of adjacent bags **10** permit the waste material **68** to be removed without disconnecting a bag **10** from the elongate blank **12**.

Second Embodiment

As shown in FIG. **9**, a blank **12'** may have bags **10***a*, **10***b* arranged with a spout **20***a* of one bag **10***a* adjacent to a V-shaped end wall of the other bag **10***b*. The individual bags **10***a*, **10***b* may be of the same construction as described with reference to the other embodiment and blank **12**. To facilitate description of this embodiment, to the extent the bags are the same as in the previous embodiment, the same reference numbers will be applied. In this embodiment, a perforated line **100** defines the proper length of the spout **20***a*, and defines in part an interconnecting section **22'** between the bags **10***a*, **10***b*. The spout **20***a* is shown as part of an end wall of the bag **10***a*. A V-shaped separation line **70'** facilitates separation of a bag from the blank **12'**, and also defines in part the interconnecting section **22'**. The remainder of the interconnecting section **22'** is defined by heat seals **34'** and **36'** which define the spout **20***a* and which intersect, lead to or connect with the separation line **70'**. Scrap material **68'** is defined around the spout **20***a* and the V-shaped end wall by heat seals **34'** and **36'**, and separation line **70'** which leads to the tear diverter lines **72** which in turn lead to the heat seals **52** and **54** defining the V-shaped end wall. The separation line **70'** may extend beyond the seals **34'** and **36'**. This permits widening or narrowing of the spout **20***a* as desired for a particular application without varying the separation line **70'**.

Accordingly, when the scrap material **68'** is separated or torn from the blank **12'**, the tear follows heat seals **34'** and **36'** until the tear reaches the separation line **70'**. The tear follows the separation line **70'** to the tear diverter lines **72** and then to heat seals **52** and **54** permitting complete removal of the waste material **68'**. As in the previous embodiment, the interconnecting section **22'** remains between and interconnecting the adjacent bags **10***a*,**10***b* after removal of the waste material **68'** to enable the blank to remain intact for further processing and the like.

Those skilled in the art will appreciate that modifications may be made without departing from the spirit and scope of the present invention as defined by the appended claims. For example, while the bulk bags or liners **10** have been described as having a spout **20** in the top wall **14**, the bags **10** can be reversed with the spout in the bottom wall **16** and a closed top wall **14**. Further, instead of a spout **20** at the top wall **14**, the bags **10** may be generally open at their upper end, among other configurations, including a closed top and closed bottom with a spout or discharge opening in a sidewall **18** of the bag **10**. Still other modifications and embodiments will be apparent from the teachings of this disclosure. As used in this description and the claims, the term flexible containers encompass and include both bags and liners.

What is claimed is:

1. A method of forming a plurality of interconnected flexible containers from an elongated blank of material, the method comprising the steps of:

providing the blank in gusseted form with a pair of gusset panels disposed between a pair of overlying flat panels;

forming a wall of a first container by connecting each flat panel to an adjacent portion of each gusset panel along

at least one inclined line forming interconnected triangular portions;

forming a wall of a second container spaced from the wall of the first container by connecting each flat panel to the adjacent portion of each gusset panel along at least one inclined line forming interconnected triangular portions;

providing two separation and tear lines extending between and connecting corresponding inclined lines of the walls of the first container and second container and defining an interconnecting section of the blank between said two separation and tear lines and between the walls of the first and second containers, whereby scrap waste material between said two separation and tear lines may be removed from the blank without removing the interconnecting section of the blank to prevent complete separation of the blank between the walls of the first and second containers.

2. The method of claim **1** which also comprises the step of forming a separate tear diverter line extending along and forming a portion of each tear line with each tear diverter line extending to and intersecting a separate one of the inclined lines of one of the walls of the first and second containers.

3. The method of claim **2** wherein the inclined lines are formed by heat seals and the tear lines are defined by separate perforation lines in the blank.

4. The method of claim **2** wherein the tear diverter line is formed by heat sealing each flat panel to an adjacent portion of each gusset panel in like manner to the inclined lines of the walls of the first and second containers.

5. The method of claim **1** which also comprises the step of forming a separation line within the interconnecting section to facilitate separating a container from the blank with more force required to tear the blank along the separation line than is required to tear the blank along the tear lines so that a tear may be performed along the tear lines adjacent to a container without initiating or causing a tear along the separation line of that container.

6. The method of claim **5** wherein the separation line and tear line are each formed by aligned perforations in the blank with the distance between adjacent perforations in each separation line being greater than the distance between adjacent perforations in each tear line.

7. The method of claim **5** wherein the tear line is defined by a cut completely through a panel of the blank and the separation line is defined by aligned perforations in the blank.

8. The method of claim **1** wherein the step of forming the wall of both the first container and second container is accomplished by forming two inclined lines of connection leading to an apex to define the triangular portions of the walls of the first and second container and wherein the step of forming at least one tear line is accomplished by forming two tear lines spaced apart from each other with one tear line on each side of the apex to define the interconnecting section between the two tear lines and between the walls of the first and second containers.

9. A plurality of interconnected flexible containers formed on an elongated blank of material having opposed gusset panels received between overlying flat panels, the plurality of interconnected flexible containers comprising:

at least one end wall of each container on the blank defined by interconnected triangular portions defined by lines of connection between the flat panels and adjacent portions of the gusset panels, and at least two sidewalls of each container connected to a corresponding end wall and defined in part by one or more of the flat panels and gusset panels;

an interconnecting section between two separation lines extending across said blank, said interconnecting section connecting adjacent end walls of adjacent containers said separation lines facilitating a separation of a container from the interconnecting section, whereby waste material between adjacent bags may be removed from the blank without removing the interconnecting section of the blank to prevent complete separation of the blank between the end walls of adjacent containers.

10. The interconnected containers of claim **9** in which a tear line defines part of each separation line and facilitating a separation of the waste material without separating the interconnecting section from the blank.

11. The interconnected containers of claim **10** which also comprises a tear diverter line extending along and forming a portion of each tear line with a separate tear diverter line extending to and intersecting a separate one of the lines of connection of the end walls of containers.

12. The interconnected containers of claim **11** wherein each line of connection and each tear diverter line is defined by a heat seal.

13. The interconnected containers of claim **10** wherein the tear line and separation line are each defined by aligned perforations in the blank with the distance between perforations of the separation line being greater than the distance between perforations on the tear line so that waste material may be torn away from the blank along the tear line without tearing the blank along the separation line.

14. The interconnected containers of claim **10** wherein the tear line is defined by a cut completely through a panel of the blank and the separation line is defined by aligned perforations in the blank.

15. The interconnected containers of claim **10** which also comprises a second separation line within the interconnecting section and at least substantially separate from the other separation line to facilitate removal of the interconnection section from the blank after at least one of the containers connected to the interconnecting portion is removed from the blank.

16. The interconnected containers of claim **9** which also comprises a tear diverter line extending between a line of connection and a separation line, and said tear diverter line, line of connection, and separation line defining the waste material to facilitate removal of the waste material.

17. A method of forming a plurality of interconnected flexible containers from an elongated blank of material, the method comprising the steps of:

providing the blank in gusseted form with a pair of gusset panels disposed between a pair of overlying flat panels;

forming a wall of a first container by connecting each flat panel to an adjacent portion of each gusset panel along at least one inclined line forming interconnected triangular portions;

forming a wall of a second container spaced from and generally adjacent to the wall of the first container by connecting each flat panel to the adjacent portion of each gusset panel along appropriate lines;

providing an interconnecting section between two separation lines extending across the blank and between the walls of the first and second containers, whereby waste scrap may be removed from the blank without removing the interconnecting section of the blank to prevent complete separation of the blank between the walls of the first and second containers.

18. The method of claim 17 which also comprises the step of forming a separation line which defines in part the interconnecting section and facilitates separation of a bag from the blank.

19. The method of claim 17 which also comprises the step of forming a spout defining in part the wall of the second container by connecting the flat panels to their adjacent portions of each gusset panel along lines defining the spout.

20. The method of claim 19 wherein said lines defining the spout define in part the interconnecting section.

21. The method of claim 17 wherein the step of providing the two separation lines with the interconnecting section between them comprises, at least in part, forming two perforated lines along which each of the containers may be separated from the interconnecting section.

22. The method of claim 17 wherein the step of forming the wall of the second container is accomplished by connecting each flat panel to the adjacent portion of each gusset panel along at least one inclined line forming interconnected triangular portions.

23. The method of claim 21 which also comprises the step of forming a spout defining in part the wall of the second container by connecting each flat panel to adjacent portions of each gusset panel along lines defining the spout and wherein at least one of said perforated lines defines in part the spout.

24. The method of claim 18 which also comprises the step of forming a tear diverter line extending between the inclined line of the wall of the first container and the separation line.

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